

Correlation Example¹

Time since Ph.D.			Publications			
X	$X - \bar{X}$	$(X - \bar{X})^2$	Y	$Y - \bar{Y}$	$(Y - \bar{Y})^2$	$(X - \bar{X})(Y - \bar{Y})$
1	-8.6	73.96	2	-5.6	31.36	48.16
2	-7.6	57.76	4	-3.6	12.96	27.36
5	-4.6	21.16	5	-2.6	6.76	11.96
7	-2.6	6.76	12	4.4	19.36	-11.44
10	0.4	0.16	5	-2.6	6.76	-1.04
4	-5.6	31.36	9	1.4	1.96	-7.84
3	-6.6	43.56	3	-4.6	21.16	30.36
8	-1.6	2.56	1	-6.6	43.56	10.56
4	-5.6	31.36	8	0.4	0.16	-2.24
16	6.4	40.96	12	4.4	19.36	28.16
15	5.4	29.16	9	1.4	1.96	7.56
19	9.4	88.36	4	-3.6	12.96	-33.84
8	-1.6	2.56	8	0.4	0.16	-0.64
14	4.4	19.36	11	3.4	11.56	14.96
28	18.4	338.56	21	13.4	179.56	246.56

$$\bar{X} = 9.60$$

$$\sum(X - \bar{X})^2 = 787.60$$

$$\bar{Y} = 7.60$$

$$\sum(Y - \bar{Y})^2 = 369.60$$

$$\sum(X - \bar{X})(Y - \bar{Y}) = 368.60$$

$$r = \frac{\sum(X - \bar{X})(Y - \bar{Y})}{\sqrt{\sum(X - \bar{X})^2 \sum(Y - \bar{Y})^2}}$$

$$= \frac{368.60}{\sqrt{(787.60)(369.60)}}$$

$$= .68$$

$$t = \frac{r\sqrt{N-2}}{\sqrt{1-r^2}}$$

$$= \frac{.68\sqrt{13}}{\sqrt{1-.68^2}}$$

$$= \frac{2.45}{.73}$$

$$= 3.36$$

$$df = N - 2 = 15 - 2 = 13, t_{crit, \alpha=.05} = 2.160$$

There is a significant positive correlation between the time since a faculty member receives his or her Ph.D. and his or her number of publications, $r = .68$, $p < .01$.

¹ Numerical example from Cohen, Cohen, West, & Aiken, 2003

Syntax

```
get file='c:\jason\spsswin\da2\c&c2_2_2 second edition.sav'.
```

```
correlations vars=yrsphd numpubs.
```

Correlations

Correlations

		yrsphd	numpubs
yrsphd	Pearson Correlation	1	.683**
	Sig. (2-tailed)	.	.005
	N	15	15
numpubs	Pearson Correlation	.683**	1
	Sig. (2-tailed)	.005	.
	N	15	15

** . Correlation is significant at the 0.01 level (2-tailed).